ABSTRAK

EVALUASI KESESUAIAN UNIT PENGOLAHAN AIR LIMPASAN DI BLOK WATUDUKUN PT SEMEN GROBOGAN, KABUPATEN GROBOGAN, PROVINSI JAWA TENGAH

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PT Semen Grobogan merupakan industri pertambangan batugamping dan produksi semen yang memanfaatkan Blok Watudukun sebagai lahan tambang. Perusahaan perlu mengelola air di area tambang untuk menjaga produktivitas penambangan dan kualitas lingkungan. Saat ini perusahaan telah mengolah air limpasan dengan kolam sedimentasi, namun tidak ada kajian terkait kesesuaian unit dengan karakteristik air limpasan yang berfokus pada kualitas. Tujuan penelitian ini adalah mengetahui karakteristik air limpasan di Blok Watudukun yang mencakup aspek kualitas dan kuantitas, mengevaluasi kesesuaian unit pengolahan air limpasan, serta menentukan arahan pengelolaan yang sesuai dengan hasil analisis.

Kualitas air limpasan diketahui dengan pengujian laboratorium terhadap parameter pH, *Total Suspended Solid* (TSS), *Total Dissolved Solid* (TDS), dan *Chemical Oxygen Demand* (COD) yang berpotensi tinggi akibat kontak air limpasan dengan batugamping dan area ladang. Sampel air limpasan diambil dari dua kolam pengendapan dan saluran drainase penghubungnya. Analisis kuantitas air limpasan dengan metode Gumbel untuk mengetahui curah hujan rencana dan metode rasional untuk proyeksi debit limpasan. Evaluasi kesesuaian unit pengolahan dilakukan dengan membandingkan hasil uji kualitas air dengan baku mutu air danau pada PP No 22 Tahun 2021 serta volume limpasan dan waktu detensi dengan kapasitas kolam eksisting.

Hasil uji laboratorium menunjukkan beberapa parameter melebihi baku mutu yaitu pH 9,1, TSS 218-571 ppm, dan COD 63 ppm, sementara TDS masih memenuhi baku mutu. Analisis terhadap data hujan diperoleh nilai curah hujan rencana 29,6910 mm/hari, debit limpasan periode ulang 10 tahun 0,7507 m^3/detik dan 0,6233 m^3/detik. Kolam pengendapan eksisting memiliki volume sebesar 2700 m^3 dan 2150 m^3 mampu menampung air limpasan dengan waktu detensi 32 menit. Rekomendasi arahan pengelolaan adalah penambahan unit pengolahan air berupa kolam ekualisasi, lahan basah buatan, dan kolam indikator, serta penanaman *cover crop* di sekitar kolam untuk meningkatkan stabilitas dan mengurangi erosi.

Kata kunci: Air limpasan, Pertambangan Batugamping, Kolam Pengendapan, Lahan Basah Buatan

ABSTRACT

EVALUATION OF THE SUITABILITY OF RUNOFF TREATMENT UNITS IN THE WATUDUKUN BLOCK PT SEMEN GROBOGAN, GROBOGAN REGENCY, CENTRAL JAVA PROVINCE

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PT Semen Grobogan is a limestone mining and cement production industry utilizing the Watudukun Block as a mining area. The company needs to manage water in the mining area to maintain mining productivity and environmental quality. Currently, the company treats runoff water using sedimentation ponds. However, there is no study regarding the suitability of the unit with the runoff water characteristics. The objectives of this research are to determine the characteristics of runoff water in the Watudukun Block, which includes quality and quantity aspects, to evaluate the suitability of the runoff water treatment unit, and to determine appropriate management directives based on the analysis results.

The quality of the runoff water was determined through laboratory testing of pH, Total Suspended Solids (TSS), Total Dissolved Solids (TDS), and Chemical Oxygen Demand (COD) parameters, which have the potential to be high due to contact between runoff water, limestone, and field areas. Runoff water samples were taken from two settling ponds and their connecting drainage channels. The quantity analysis of runoff water used the Gumbel method to determine the design rainfall and the rational method for runoff discharge projection. The evaluation of the treatment unit suitability is conducted by comparing the water quality test results with the water quality standards in Government Regulation No. 22 of 2021, and comparing the runoff volume and detention time with the existing pond capacity.

Laboratory test results showed that several parameters exceeded the lake water quality standards of Government Regulation No. 22 of 2021, namely pH 9.1, TSS 218-571 ppm, and COD 63 ppm, while TDS still met the standards. Analysis of rainfall data yielded a design rainfall value of 29.6910 mm/day, with a 10-year return period runoff discharge of 0.7507 m^3/sec and 0.6233 m^3/sec. The existing settling ponds, with volumes of 2700 m^3 and 2150 m^3, are capable of holding runoff water with a detention time of 32 minutes. The recommended management directives are the addition of water treatment units, including an equalization pond, constructed wetlands, and an indicator pond, as well as planting cover crops around the ponds to enhance stability and reduce erosion.

Keywords: Runoff Water, Limestone Mining, Sedimentation Pond, Constructed Wetlands